Cisco Nexus 7000 Series Flexible Netflow
Enables Visibility into Data Center Network Traffic

Introduction

Today enterprise managers need detailed profiles of applications that traverse their networks. To efficiently operate, scale, and consolidate their networks, they need to know what applications are consuming bandwidth, who is using them, when they are being used, and what activities are prevalent in the data center. With this information, data center managers have visibility into their networks, which is crucial to exerting control over the network, finding the precise reasons for performance problems and possible security concerns, and managing the overall end-user experience.

NetFlow invented by Cisco has become the standard for acquiring IP operational data for many customers. Visibility into the network is an indispensable tool

Flexible NetFlow

Flexible NetFlow is the latest Cisco NetFlow feature;a subset of Cisco IOS® Flexible NetFlow is provided with Cisco NX-OS to support data center needs such as the following:

- Define a flow record that is optimal for a particular application by selecting the keys from a large collection of predefined fields.
- Monitor a wide range of packet information, producing new information about network behavior.
- Enhanced network anomaly and security detection.

## Cisco Nexus 7000 Series Flexible NetFlow Attributes

- **System scalability:** Up to 500,000 (with 95 percent utilization efficiency) cached flows for forwarding engine
- **Sampled NetFlow:** Effective hardware-based sampling to improve and preserve NetFlow table utilization; capability to implement full NetFlow on critical interfaces while implementing sampled NetFlow on other, less critical network portions
- **Egress NetFlow and Bridged NetFlow:** Useful to track flows within a VLAN
- **TCP flags:** Now exported as part of the flow information; very useful in understanding TCP flow directions and detecting denial-of-service (DoS) attacks
- **Flexible NetFlow command-line interface (CLI) look and feel:** Template based and easy to use

The Cisco Nexus 7000 Series is a modular data center class line of switches designed for highly scalable end-to-end 10 Gigabit Ethernet networks. The fabric architecture scales beyond 15 terabits per second (Tbps), with future support for 40-Gbps and 100-Gbps Ethernet. This new platform is designed for exceptional scalability, continuous systems operation, and transport flexibility. Cisco Nexus 7000 is powered by Cisco NX-OS, a state-of-the-art operating system. Cisco NX-OS is a data center–class operating system built with modularity, resiliency, and serviceability at its foundation. A subset of Flexible NetFlow is available with Cisco NX-OS to support datacenter requirements.

NetFlow Application in Data Center

The capability to characterize IP traffic and understand who sent it, the traffic destination, the time of day, and the application information is critical for data center operations. It helps data center managers determine how to optimize resource utilization, plan network capacity, build traffic patterns models for consolidation, and determine where to apply quality of service (QoS), and it plays a vital role in network security for detection of DoS attacks and network-propagated worms (Figure 1).

Figure 1. Different Flow Monitors for Detecting Different Information
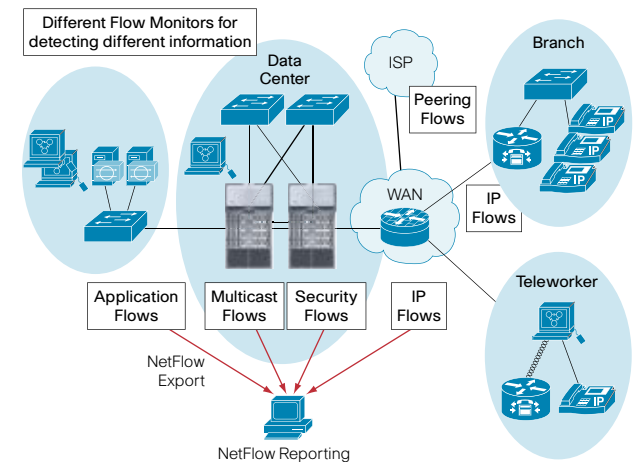
Flexible NetFlow data center applications include:

- Real-time data center network monitoring
- Application and user profiling
- Network planning and capacity planning
- Security incident detection and classification
- Accounting and billing
- Network data warehousing, forensics, and data mining
- Troubleshooting

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Primary Advantages of Flexible NetFlow

- Flexibility, scalability, and aggregation of flow data beyond traditional Cisco NetFlow
- Capability to monitor a wider range of packet information than tradition Cisco NetFlow, producing new information about network behavior
- Enhanced network anomaly and security detection
- User-configurable flow information to perform customized traffic identification and the capability to focus and monitor specific network behavior
- Convergence of multiple accounting technologies into one accounting mechanism

Figure 2. NetFlow Live View Screen shot
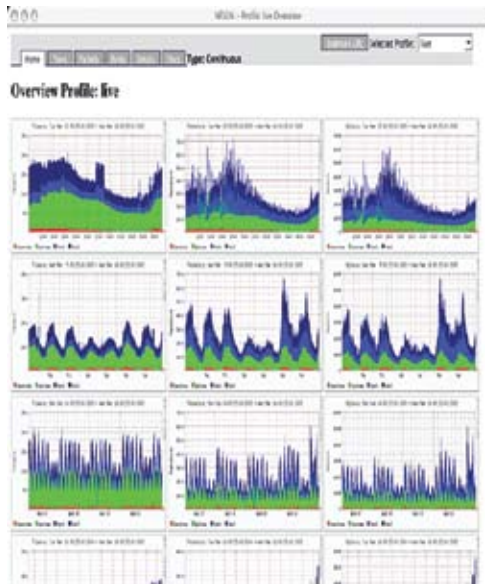
Flexible NetFlow Operation on Cisco Nexus 7000 Series Switches/Cisco NX-OS

- Record: The flow record defines the information the Cisco NetFlow will track. The flow record is defined as a set of key and non-key fields.
- Export: The flow exporter describes where and how the information collected by Cisco NetFlow is exported to the reporting server or Cisco NetFlow collector.
- Monitor: A flow monitor is essentially a Cisco NetFlow cache. Flow monitors can also include packet sampling information.

Figure 3. Flexible NetFlow Operations on Cisco 7000 Series Switch
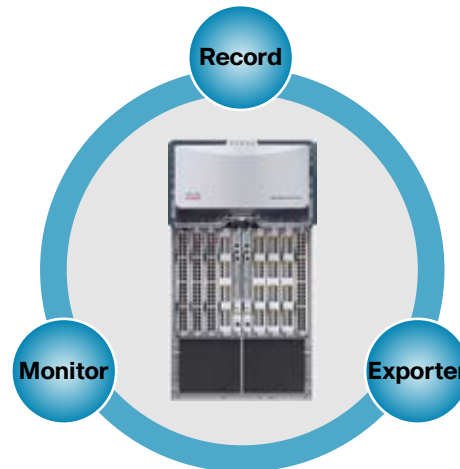
Why Datacenter Customers should Invest in Flexible NetFlow

- Subset of Cisco IOS Flexible NetFlow to support data center needs
- System scalability of up to 500,000 (with 95 percent utilization efficiency) cached flows for forwarding engine
- Effective hardware-based sampling to improve NetFlow table utilization
- Capability to create and track **bridged** IP flows
- Support for NetFlow Export Version 5 (**the most used**) and NetFlow Export Version 9 (**the most flexible**)
- Transparent Cisco Inservice Software Upgrade (ISSU) and process restartability, supporting high availability
- Same command-line interface (CLI) look and feel as Cisco IOS Flexible NetFlow

For More Information

- Cisco Nexus 7000: www.cisco.com/go/nexus7000
- Cisco NX-OS: www.cisco.com/go/nxos
- Cisco Data Center Network Manager (DCNM): www.cisco.com/go/dcnm